ASTRONOMICAL SOCIETY OF LONDON.

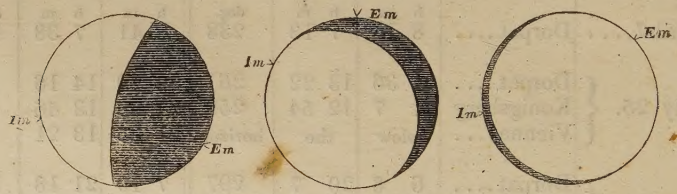
December 12, 1828. No. 15.

THE first paper read this evening was the following: — Occultations of Aldebaran by the Moon, in the year 1829, computed for ten different observatories in Europe, at the request of the Council of this Society, by Thomas Henderson, Esq. of Edinburgh, and Thomas Maclear, Esq. of Biggleswade, in Bedfordshire.

1829.	PLACE.	IMMERSIONS.			EMERSIONS.		
		Sidereal time.	Mean solar time.	Angle.	Sidereal time.	Mean solar time.	Angle.
		h m	h m	deg.	h m	h m	deg.
April 7....	Dorpat....	8 16	7 13	238	8 41	7 38	192
July 25.	Dorpat....	21 36	13 22	261	22 29	14 16	54
	Konigsberg	21 7	12 54	259	21 59	13 46	53
	Vienna....	below	the	horizon.	21 35	13 21	55
Aug. 21.	Dorpat....	6 8	20 7	297	7 19	21 18	121
	Konigsberg	5 38	19 37	284	6 51	20 50	134
	Vienna....	5 21	19 20	265	6 30	20 29	159
	Naples....	5 29	19 28	238	6 3	20 2	200
	Milan	4 43	18 42	247	5 47	19 46	164
	Paris	3 59	17 58	238	5 13	19 11	138
	Greenwich.	3 45	17 44	254	5 2	19 1	125
	Bedford...	3 45	17 44	258	5 2	19 1	120
	Edinburgh.	3 30	17 20	268	4 46	18 45	105
	Dublin....	3 12	17 11	257	4 28	18 27	107
Oct. 15.	Dorpat....	0 52	11 15	292	1 41	12 4	35
	Konigsberg	0 17	10 40	283	1 7	11 31	32
	Vienna....	23 45	10 8	265	0 41	11 4	34
	Naples....	23 22	9 45	243	0 22	10 46	41
	Milan	23 10	9 34	262	0 4	10 27	30
	Paris	22 51	9 14	280	23 35	9 58	19
	Greenwich.	22 48	9 12	292	23 25	9 49	12
	Bedford...	22 48	9 12	300	23 23	9 47	5
	Edinburgh.	22 50	9 13	313	23 12	9 35	358
	Dublin....	22 31	8 55	306	22 56	9 20	1

1829.	PLACE.	IMMERSIONS.			EMERSIONS.		
		Sidereal time.	Mean solar time.	Angle.	Sidereal time.	Mean solar time.	Angle.
		h m	h m	deg.	h m	h m	deg.
Dec. 9...	Dorpat ...	1 4	7 51	262	2 8	8 55	64
	Konigsberg	0 29	7 16	253	1 33	8 20	65
	Vienna ...	0 0	6 47	236	1 3	7 50	66
	Naples ...	23 42	6 29	215	0 41	7 28	69
	Milan	23 25	6 12	233	0 25	7 12	61
	Paris	23 1	5 49	249	23 59	6 46	51
	Greenwich.	22 57	5 44	257	23 53	6 40	47
	Bedford ...	22 56	5 43	260	23 52	6 39	45
	Edinburgh.	22 53	5 40	271	23 44	6 31	41
	Dublin ...	22 36	5 23	268	23 27	6 14	39

The following are the phases of the three occultations which will be visible at Greenwich, as shewn in a telescope that does *not* invert.



The occultations in April and July will not be visible at Greenwich, although marked as such in the Nautical Almanack : nor will they be seen in any of the western part of Europe.

In the preceding ephemeris, the column marked *Angle* denotes the point of the moon's limb where the phenomenon will take place, reckoning from the vertex, or highest point of the moon's limb, towards the west, or right hand, round the circumference.

The object of the Council, in procuring these computations, has been to induce astronomers to look out for the occultations, with a view principally to determine whether Aldebaran will *appear projected on the face of the moon*, as has frequently been observed in former occultations of this star. It is therefore requested, that particular attention be paid to the following circumstances: viz. 1. whether the star undergoes any change of light, of colour, or of motion, on its immediate approach to the edge of the moon; 2. whether it appears to be projected on the moon's disc, and for how long a time; 3. whether the dark limb of the moon be distinctly visible and well defined at the time of the phenomenon; 4. whether the star, on its emersion, appears on the moon's disc, or emerges quite clear of the moon's border.

In recording the observations, it is desirable that the observer should describe the telescope made use of, and that the same instrument should be employed in observing both the immersion and emersion; that it should be noted whether the telescope was adjusted to the moon or to the star, and whether it had been altered during the observations. And as it is probable that the phenomenon may differ in some slight particulars, even to persons observing together in the same place, it is hoped that the actual appearances will be recorded (as they may present themselves) by each person, without suffering his impression to be biassed by the opinion or representation of others.

It is further requested, that, in recording such observations as may be made, the *correct* time (as well as the place) of observation may be given; that is, the time shewn by the clock *corrected* for its *error*, in order that comparisons may be made of the best mode of computing occultations. Two different methods have been pursued in computing the ephemeris here given; and although the results have agreed sufficiently near to enable the Council to ascertain the time to the nearest minute, yet, in some of the cases, the results have varied from each other much more than might have been expected. The computations will probably be revised and investigated, when the correct time and place are ascertained.

The next paper was "On the determination of the Constant of Aberration of Light, from 4119 observations made at the Royal Observatory at Greenwich, during the years 1825, 1826, 1827, and 1828, with the two mural circles of Troughton and Jones, by Mr. William Richardson." The author remarks, that, after the great labour bestowed on the subject of aberration by those eminent astronomers, Bradley, Delambre, Bessel, Lindenau, Brinkley, and Struve, it might appear superfluous to attempt the exact determination of an element, the amount of which is known within such small limits. However, as this attempt has never been made from the Greenwich observations, since the time of Bradley, and as the two mural circles erected there, together with the method now adopted of observing alternately by reflection, afford such powerful means of detecting the most minute variations in the apparent motions of the heavenly bodies, the author conceived that the results of observations made under such favourable circumstances might be highly acceptable to the practical astronomer. With this view he has undertaken the reduction of upwards of 4000 recent observations of 14 of the Greenwich stars most favourably situated for determining this element, those having been selected which are the most affected by aberration, and the least affected by refraction; whereby the errors of observation have the least possible influence on the result. It will be seen, by the following Table, that the final result (giving equal weight to each observation) obtained by Troughton's circle is 20″,505, and by Jones's circle 20″,502; and, for the sake of round numbers, Mr. Richardson proposes to adopt 20″,5 as the most probable value of the constant of aberration.

This value is somewhat greater than that proposed by Dr. Brinkley and Mr. Struve, and recently adopted by this Society; but rather less than the values deduced by MM. Bessel and Lindenau.

Names of the Stars.	TROUGHTON'S CIRCLE.			JONES'S CIRCLE.		
	Const. of Aberr.	No. of Obs.	Cons. of Aber. × No. Obs.	Const. of Aberr.	No. of Obs.	Cons. of Aber. × No. Obs.
α Cassiopeæ	20·137	80	1610·960	20·408	80	1632·640
Polaris	20·246	160	3239·360	20·213	152	3072·376
———, by ref.	20·390	73	1488·470	20·201	72	1454·472
——— S. P. . .	20·767	150	3115·050	20·973	150	3145·950
———, by ref.	20·427	70	1429·890	20·285	62	1257·670
α Ursæ Majoris. .	20·723	80	1657·840	20·594	80	1647·520
ζ ——————— .	20·411	80	1632·880	20·575	80	1646·160
η ——————— .	21·028	80	1682·240	20·733	80	1658·640
α Draconis	21·059	80	1684·720	21·436	80	1714·880
β Ursæ Minoris .	20·924	80	1673·920	21·112	80	1688·960
γ Draconis	20·577	240	4938·480	20·456	240	4909·440
α Lyræ	20·403	160	3264·480	20·324	160	3251·840
——, by ref. . .	20·267	35	709·345	20·712	32	662·784
β ——	20·146	80	1611·680	20·424	80	1633·920
δ Draconis	20·597	160	3295·520	20·376	160	3260·160
α Cygni	20·354	123	2503·542	20·112	128	2574·336
——, by ref. .	20·359	80	1628·720	20·732	80	1658·560
α Cephei	20·373	137	2791·101	20·265	132	2674·980
β ———	20·386	118	2405·548	20·358	125	2544·750
	389·574	2066	42363·746	390·291	2053	42090·033
Means			20,505			20,502

Lastly, there was read a paper by Mr. James Epps, upon the inclination of the axis of the transit instrument, with accompanying Tables.

If the pivots of a transit be equal, but the axis not horizontal, the circle described by the instrument will not pass through the zenith, but at a certain distance from it, which is readily *measured* by the level. It is not always easy to correct this inclination with the utmost accuracy; neither will an instrument preserve this adjustment when made, except under very favourable circumstances: hence a correction must be applied to the observed R.A. of a star, in order to obtain the R.A. which would have been observed if the axis had been truly horizontal.

Now, if i be the inclination of the axis in seconds of time, as determined by the level; α the N.P.D. of the star; L the latitude, λ the co-latitude of the place of observation; Mr. Epps shews, that the correction required $= i \times \frac{cos\,(\alpha - \lambda)}{sin\,\alpha}$ or $i\,(cos\,\mathrm{L} + sin\,\mathrm{L}.\,cot\,\alpha)$ to be added to the observed R.A. when the west end of the axis is elevated, and *versâ vice*. Below the pole these signs are changed.

The present Tables contain a factor $m = cos\ L + sin\ L.\ cot\ \alpha$, and are precisely similar to those already given by Mr. Epps for the azimuthal deviation; viz. for every 10′ of latitude, from 51° to 53° inclusive, with a column of the variations for 2 degrees of latitude. Hence, having at any time the value of the inclination i, expressed in sidereal time, we have merely to find m by the Tables, when the product $m\,i$ will be the reduction of the observation to the meridian.

It may be proper to add, that in finding the azimuthal deviation of the instrument by the observed transits of two stars, according to the method shewn in a former paper, the observations should be previously corrected for the errors arising from the inclination of the axis, and also for the error of collimation, should such an error exist.

A letter was read from Dr. Lee, requesting the Society to accept of the two-feet meridian circle, divided on gold, by Troughton, for the late Rev. Lewis Evans.

A letter was also read from Dr. Wollaston, presenting to the President and Council of the Society his fine triple object-glass achromatic telescope, made by the late Mr. Peter Dollond, in the year 1771, and which he had himself adjusted agreeably to the method laid down by him in the *Philosophical Transactions* for 1822.

[The Council take this opportunity of announcing to the members, that *blank forms* for registering observations with the transit instrument and with the meridian circle or quadrant, have been printed at the expense of the Society, and that any member may be supplied with some copies thereof, on applying to the Secretary for that purpose.]

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